

THE SECRETARY OF DEFENSE  
WASHINGTON

MAR 3 1958

Dear Mr. President:

A short summary of progress on the ICBM and IRBM programs during February 1958 is attached.

Two flight tests of ATLAS missiles were conducted during February. In both tests the missile became unstable at approximately 110 seconds after lift-off and premature cutoff of the engines occurred followed by missile breakup. Because of the similarity of the flight failures, tests are being conducted on the autopilot.

On 28 February a THOR missile was flight tested with the primary objective being to demonstrate the separation and re-entry of the full-scale nose cone. Premature cutoff of the engine prevented achievement of all test objectives although separation of the nose cone did occur. The flight test data are being analyzed to determine the cause of the engine cutoff.

As noted in the January report the THOR missile flight tested on January 28, 1958 had an apparent failure in the guidance system. Analysis of the flight test data indicates that the difficulty was caused by failures in both the power supply and guidance equipment. Tests are now underway to determine appropriate engineering modifications.

The November and December reports also noted the premature engine cutoff difficulty encountered in the November and December JUPITER missile flight tests. Analysis of the flight test data and the results of extensive ground tests indicate that the engine cutoff was caused by a bearing failure in the turbopump gear box. It has been decided to postpone the next JUPITER flight test until the gear box has been redesigned and tested. Accordingly, the next JUPITER flight test has been rescheduled from February 25 to May 14, 1958.

Since the engine used in the JUPITER is basically similar to the THOR and ATLAS engines the possibility of the flight tests on these missiles also being delayed is being investigated. However, the environmental conditions in the JUPITER application may be sufficiently different to cause failure in the JUPITER missile and not in the THOR and ATLAS. The corrective effort will be directed at removing any possibility of a marginal condition existing in the basic engine.

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The difficulties outlined above emphasize the need for an adequate flight test program to assure that these missiles are operationally reliable when deployed. As the causes of the malfunctions are determined, engineering modifications are being made on the follow-on missiles. While it is believed that the IOC planning dates are still valid we will not be assured of this fact until the corrected missiles have been successfully flight tested.

With great respect, I am

Faithfully yours,

*John De Geron*



Attachment

The President  
The White House

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### Initial Operational Capability (IOC) Status

Approval for the TITAN hard base design contract has not yet been received from the Secretary of Defense. Delays in the receipt of this approval will result in changes in the original schedule and cause corresponding delays in the design and construction completion.

Concepts for hardened TITAN operational facilities and the Operational System Test Facility at Cooke Air Force Base were presented to the Office of the Secretary of Defense and the Ballistic Missiles Committee. The Operational System Test Facility concept was approved by the Ballistic Missiles Committee of the Office of the Secretary of Defense.

### THOR (IRBM#1) PROGRAM



### Missile Test Program Status

THOR missile 120, the twelfth flight missile, underwent a successful flight readiness firing on 4 February and was launched on 28 February. The primary test objective of THOR 120 was to demonstrate the separation and re-entry of the General Electric nose cone. The objective was met in spite of the premature cut-off signal which cut off the propulsion after 109 seconds of flight. The premature signal may have been caused by a malfunctioning circuit associated with the main chamber pressure cut-off switch. Preliminary data indicate that the nose cone separated properly. A detailed report of nose cone performance will be given in the March report after reduction of test data.

Further analysis of the January flight of THOR 114 reveals that the difficulty encountered was attributable in part to the inverter and in part to guidance equipment. Improved gimbal bearings and the substitution of a DC instead of an AC torque exciter will eliminate most of the problem. Remaining is the problem of the apparent ease with which large voltage transients can be transmitted from the missile inverter to the guidance system power supply. It is believed that the new Bendix inverter will alleviate this problem when incorporated in the near future.

The scheduled testing of THOR missiles on Edwards Rocket Base battleship test stand 1-5 has been completed. The stand has been released for use in support of the ICBM program.

THOR missile 110 was fired on 21 February at the Douglas, Sacramento, captive test facilities. The primary test objectives were to prove facility

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compatibility with the missile and to establish effective countdown procedures. All test objectives were met. The next THOR 110 firing is scheduled in March. THOR 111 underwent the first successful captive test firing on Edwards Rocket Base test stand 1-2. The primary test objective was to test missile/facility compatibility. All test objectives were met.

#### Component Development Status

Engine development testing during February was on the MB-3 propulsion system. The MB-3 is the improved THOR engine to be used on operational missiles. The results were excellent.

#### Launching and Handling

The first items of THOR operational ground support equipment were accepted by the Air Force in February.

A mockup of the THOR Squadron Command Control Room and equipment was completed in February. An Engineering Design Review was held at Douglas on 28 February with good results.

#### Production

Integration of the advanced design MB-3 engine mockup with the airframe section is progressing satisfactorily. By the end of February, acceptance of the first MB-3 engine was completed, and the engine was enroute to the airframe contractor.

Douglas is preparing to deliver the first operationally configured missile (THOR 138) in May.

#### Actual Deliveries

<u>ACTUAL DELIVERIES</u>	<u>PRIOR</u>	<u>FEBRUARY</u>
Missiles	22	3
Engines	41	4
Guidance, Airborne:		
AC Spark Plug	27	3
Bell Telephone (TITAN)	11	0
Nose Cones	3	3

#### Initial Operational Capability (IOC) Status

In order to insure the availability of trained personnel to meet the port of embarkation dates of the first THOR squadron, exact plans for scheduling students through Phase I factory training courses and test sites have been established. The Air Force has issued a letter contract permitting the manufacturers to prepare for training and for conducting individual

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training courses through fiscal year 1958. Reporting instructions for students attending February and March courses have been issued.

The blockhouse for the first THOR training facility (75-1) at Cooke Air Force Base and the maintenance shop will be ready for occupancy in April. The launch stands will be completed on schedule in July. The construction of launch training facilities 75-2 and 75-3 will start in March with completion scheduled for August.

All design criteria drawings for the design of operational facilities in the United Kingdom have been forwarded to the UK facility design agency.

#### JUPITER (IRBM #2) PROGRAM

##### Missile Test Program Status

REDSTONE missile carrying JUPITER components, No. 46, was successfully fired on 11 February 1958 and its test missions were achieved. During the initial portion of the flight the inertial guidance system performed successfully through the jet stream winds with velocities up to 165 nautical miles per hour.

The thirty-third REDSTONE missile carrying JUPITER components, No. 43, was successfully flight tested on 27 February 1958 and all test objectives were accomplished.

JUPITER missile No. 5, the next JUPITER to be fired, has been modified to include additional telemetric measurements of the turbo-pump system with special measurements of gear box components. The planned firing date for missile No. 5 was tentatively set for 25 March 1958, until it was decided to postpone the firing until the redesign, fabrication, and test of the production-type turbo-pump gear box. (As of 20 March 1958, the tentative adjusted schedule for firing JUPITER missile No. 5 was 14 May 1958.)

##### Component Development Status

Laboratory tests have been conducted of North American Aviation turbo-pump gear box, believed to be responsible for the early shutdown of the sixth and seventh JUPITER missile firings. These tests indicate that the failure probably occurred in one roller bearing in the gear box. Tests are being continued in an effort to determine the precise cause of the bearing failures.

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### Production

Structural fabrication of the first JUPITER IOC missile shell, for JUPITER 101, has been completed.

Engines for JUPITER IOC missiles 101, 102, 103, and 104 have been delivered to Army Ballistic Missile Agency.

### POLARIS (FLEET BALLISTIC MISSILE) PROGRAM

The Fleet Ballistic Missile development program is progressing satisfactorily.

The POLARIS (FEM) Weapon System was recently included in the highest national priority category by the National Security Council and now is assigned the "Brick-Bat 01" urgency category within defense programs.

### Missile Test Program Status

Two National Advisory Committee for Aeronautics/Naval Ordnance Laboratory fuzing flight tests of 1/2 scale re-entry bodies were successfully conducted.

Two POLARIS Model O first-stage ballistic test chambers were statically fired.

### Component Development Status

Delivery of POLARIS A motor chambers from several manufacturers has been accelerated to minimize delays in static firing dates. Steel jet-vators with molybdenum inserts are being obtained to offset a delay from 3 May to 1 June 1958 in the first static test of a "flight design" POLARIS A motor occasioned by incorrect forging techniques for all-molybdenum jet-vators.

### Launching and Handling

The submerged launch (POP-UP) facility at San Clemente Island has been completed. Launch tests will start in March.

### Ship Navigation

Testing of navigation equipment including the North American N6A Autonavigator, the Farrand Star Tracker, and the stable table for the Reeves Radio Tracker, aboard the USS COMPASS ISLAND was performed with successful results.

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Construction is in progress on the Operational System Test Facility at Vandenberg Air Force Base.

Efforts to find suitable site locations for TITAN facilities in the vicinity of Beale and Mountain Home Air Force Bases are continuing.

#### THOR (IRBM #1) PROGRAM

THOR 174 and THOR 179 served respectively as first-stage boosters for the 3 June launch of the DISCOVERER III vehicle and the 25 June launch of the DISCOVERER IV vehicle. Both launches were from Vandenberg Air Force Base. THOR booster performance on both flights was excellent, being well within the limits specified for DISCOVERER.

THOR 137, an ABLE-Phase II re-entry test missile, was successfully launched from the Atlantic Missile Range on 11 June. While the re-entry vehicle was not recovered following its flight over a 4,300 nautical mile range, excellent telemetry data were obtained for evaluation of re-entry vehicle ablation materials.

THOR 191 (Operation "Rifle-Shot") was launched by a Royal Air Force crew from Vandenberg Air Force Base on 16 June. The missile was destroyed by range safety because of its failure to follow the specified trajectory. Photographic records of the launch have revealed certain anomalies which may be attributed to procedural errors in launch preparation.

THOR 198 was launched from the Atlantic Missile Range on 25 June. Objectives of missile system accuracy and guidance system evaluation were successfully achieved. This missile carried a data capsule containing instrumentation for investigating the external magnetic fields of the upper atmosphere. Data obtained are being evaluated.

THOR 194 was launched from the Atlantic Missile Range on 29 June. Objectives to demonstrate minimum range weapon specification on a lofted trajectory and missile system accuracy and guidance system evaluation were successfully achieved.

All elements of the first United Kingdom squadron were accepted by the Royal Air Force at Feltwell, England, on 22 June.

#### JUPITER (IRBM #2) PROGRAM

There were no JUPITER flight tests conducted during June 1959.

As of 30 June 1959, there have been a total of 18 JUPITER R&D missile firings. Of this total, 12 were considered successful, five partially successful, and one a failure.

As of 30 June 1959, there have been nine successful flights of the JUPITER all-inertial, air-bearing guidance system. There have been no flight failures attributed to the guidance system.

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Technical agreements between the U.S. Air Force (Europe) and the Italian Air Force have not been reached. The 1 April M-Day was rescinded on 1 July 1959. The new M-Day will coincide with the date the technical agreements are signed.

Because of the delay in signing the technical agreements, alternate methods of deploying the initial JUPITER launch position are being investigated. A proposal has been made that both of the JUPITER squadrons to be deployed to Italy be manned by Italian personnel. This would leave the 864th Technical Training Squadron of the Air Force available for deployment to other areas.

#### POLARIS (FLEET BALLISTIC MISSILE) PROGRAM

The POLARIS AX-10 missile, launched from the Atlantic Missile Range on 12 June, was partially successful. Following second-stage ignition and first separation, destruction of the missile occurred and the flight was aborted. Investigation continues.

The flight test of POLARIS AX-9, launched on 29 June from the Atlantic Missile Range, was successful. Impact occurred on azimuth at a range of 704 nautical miles after a flight of 12 minutes and 12 seconds. This was the first successful flight test of a fully instrumented re-entry body.

Re-entry body evaluation will continue as an objective of the Flight Test Program until design assumptions are confirmed.

Scheduled completion of the VLF (Very Low Frequency) station in Maine has been advanced one year to January 1961.

USS GEORGE WASHINGTON (SSBN-598) was launched 9 June as scheduled.

Contracts for SSBN-609 and -611 were awarded to Newport News Shipbuilding and Drydock and for SSBN-610 to Electric Boat Division on 1 July.

USS OBSERVATION ISLAND (EAG-154) began test operations at the Atlantic Missile Range.

POLARIS installation on cruisers has been deferred pending outcome of a Weapons Systems Evaluation Group study.

Fleet Ballistic Missile Operational Requirement as revised calls for a 2500-mile range POLARIS by 1964.



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